

REMARKS

I. Introduction

In response to the Office Action dated July 8, 2003, no claims have been cancelled, amended, or added. Claims 1, 3-9, 11-17, and 19-24 remain in the application. Re-examination and re-consideration of the application is requested.

II. Prior Art Rejections

A. The Office Action Rejections

In paragraphs (1)-(2) of the Office Action, claims 1, 3, 7-9, 11, 15-17, 19, 23, and 24 were rejected under 35 U.S.C. §103(a) as being unpatentable over Fayyad et al., U.S. Patent No. 6,263,337 (Fayyad) in view of Lazarus et al., U.S. Patent No. 6,430,539 (Lazarus). In paragraph (3) of the Office Action, claims 4-6, 12-14, and 20-22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Fayyad in view of Lazarus and further in view of Van Huben et al., U.S. Patent No. 6,327,594 (Van Huben).

Applicants' attorney respectfully traverses these rejections.

B. The Applicants' Independent Claims

Independent claim 1 is directed to a data structure for analyzing data in a computer-implemented data mining system, wherein the data structure is a data model that comprises a Gaussian Mixture Model that stores transactional data, a basket table that contains summary information about the transactional data, an item table that contains information about individual items referenced in the transactional data, and a department table that contains aggregate information about the transactional data, and the data model is mapped to aggregate the transactional data for cluster analysis.

Independent claim 9 is directed to a method for analyzing data in a computer-implemented data mining system, comprising: generating a data structure in the computer-implemented data mining system, wherein the data structure is a data model that comprises a Gaussian Mixture Model that stores transactional data, a basket table that contains summary information about the transactional data, an item table that contains information about individual items referenced in the transactional data, and a department table that contains aggregate information about the transactional data; and mapping the data model to aggregate the transactional data for cluster analysis.

Independent claim 17 is directed to an apparatus for analyzing data in a computer-implemented data mining system, comprising: means for generating a data structure in the computer-implemented data mining system, wherein the data structure is a data model that comprises a Gaussian Mixture Model that stores transactional data, a basket table that contains summary information about the transactional data, an item table that contains information about individual items referenced in the transactional data, and a department table that contains aggregate information about the transactional data; and means for mapping the data model to aggregate the transactional data for cluster analysis.

C. The Fayyad Reference

Fayyad describes one exemplary embodiment providing a data mining system for use in finding clusters of data items in a database or any other data storage medium. Before the data evaluation begins a choice is made of the number M of models to be explored, and the number of clusters (K) of clusters within each of the M models. The clusters are used in categorizing the data in the database into K different clusters within each model. An initial set of estimates for a data distribution of each model to be explored is provided. Then a portion of the data in the database is read from a storage medium and brought into a rapid access memory buffer whose size is determined by the user or operating system depending on available memory resources. Data contained in the data buffer is used to update the original model data distributions in each of the K clusters over all M models. Some of the data belonging to a cluster is summarized or compressed and stored as a reduced form of the data representing sufficient statistics of the data. More data is accessed from the database and the models are updated. An updated set of parameters for the clusters is determined from the summarized data (sufficient statistics) and the newly acquired data. Stopping criteria are evaluated to determine if further data should be accessed from the database.

D. The Lazarus Reference

Lazarus describes predictive modeling of consumer financial behavior by application of consumer transaction data to predictive models associated with merchant segments. Merchant segments are derived from consumer transaction data based on co-occurrences of merchants in sequences of transactions. Merchant vectors representing specific merchants are clustered to form merchant segments in a vector space as a function of the degree to which merchants co-occur more or less frequently than expected. Each merchant segment is trained using consumer transaction data

in selected past time periods to predict spending in subsequent time periods for a consumer based on previous spending by the consumer. Consumer profiles describe summary statistics of consumer spending in and across merchant segments. Analysis of consumers associated with a segment identifies selected consumers according to predicted spending in the segment or other criteria, and the targeting of promotional offers specific to the segment and its merchants.

E. The Van Huben Reference

Van Huben describes a common access method to enable disparate pervasive computing devices to interact with centralized data management systems. A modular, scalable data management system is envisioned to further expand the role of the pervasive devices as direct participants in the data management system. This data management system has a plurality of data managers and is provided with a plurality of data managers in one or more layers of a layered architecture. The system performs with a data manager and with a input from a user or pervasive computing device via an API a plurality of process on data residing in heterogeneous data repositories of computer system including promotion, check-in, check-out, locking, library searching, setting and viewing process results, tracking aggregations, and managing parts, releases and problem fix data under management control of a virtual control repository having one or more physical heterogeneous repositories. The system provides for storing, accessing, tracking data residing in said one or more data repositories managed by the virtual control repository. DMS applications executing directly within, on or behalf of, the pervasive computing device organize data using the PFVL paradigm. Configurable managers include a query control repository for existence of peer managers and provide logic switches to dynamically interact with peers. A control repository layer provides a common process interface across all managers. A command translator performs the appropriate mapping of generic control repository layer calls to the required function for the underlying storage engine.

F. The Applicants' Claims Are Patentable Over The References

Applicants' invention, as recited in independent claims 1, 9 and 17, is patentable over the references, because the claims recite limitations not found in the references. Specifically, the combination of Fayyad, Lazarus and Van Huben does not disclose a data model that comprises a Gaussian Mixnure Model that stores transactional data, a basket table that contains summary information about the transactional data, an item table that contains information about individual

items referenced in the transactional data, and a department table that contains aggregate information about the transactional data, and the data model is mapped to aggregate the transactional data for cluster analysis.

The Office Action cites Fayyad as teaching most of the elements of the independent claims, including a data structure for analyzing data in a computer-implemented data mining system, as reference number 12 in FIG. 2 and in the accompanying text. The Office Action also cites Fayyad as teaching that the data structure is a data model that comprises a Gaussian Mixture Model that stores transactional data, at col. 9, lines 22-67. In addition, the Office Action cites Fayyad as teaching that the data model is mapped to aggregate the transactional data for cluster analysis, at col. 8, lines 34-46. However, the Office Action admits that Fayyad does not disclose a basket table that contains summary information about the transactional data, an item table that contains information about individual items referenced in the transactional data, and a department table that contains aggregate information about the transactional data. Nonetheless, the Office Action asserts that Lazarus teaches these elements. Specifically, the Office Action asserts that Lazarus teaches a basket table that contains summary information about the transactional data at col. 13, Table 1, an item table that contains information about individual items referenced in the transactional data at col. 16, lines 13-21, and a department table that contains aggregate information about the transactional data at col. 12, lines 50-63.

Applicants' attorney disagrees. At the locations indicated above, Fayyad and Lazarus, taken individually or in combination, do not teach the claim limitations directed to a data model comprising a Gaussian Mixture Model that stores transactional data, a basket table that contains summary information about the transactional data, an item table that contains information about individual items referenced in the transactional data, and a department table that contains aggregate information about the transactional data, and the data model is mapped to aggregate the transactional data for cluster analysis.

For example, consider the teaching of Lazarus at col. 13, Table 1:

Lazarus: col. 13, Table 1

TABLE 1

Customer Summary File

<u>Description</u>	<u>Sample Format</u>
Account_id	Char[max 24]
Pop_id	Char ('1'-N')
Account number	Char[max 16]
Credit bureau score	Short int as string
Internal credit risk score	Short int as string
Ytd purchases	Int as string
Ytd_cash adv	Int as string
Ytd_int purchases	Int as string
Ytd	int
cash adv	Int as string
State code	Char[max 2]
Zip_code	Char[max 5]
Demographic 1	Int as string
...	
Demographic N	Int as string

Nothing in the above discussion of Lazarus teaches "a basket table that contains summary information about the transactional data." Instead, the above discussion relates only to customer summary data.

In another example, consider the teaching of Lazarus at col. 16, lines 13-21:

Lazarus: col. 16, lines 13-21

In order to obtain the initial merchant vectors, additional processing of the master files 408 precedes the analysis of which merchants co-occur in the master files 408. There are two, sequential, processes that are used on the merchant descriptions, stemming and equivalencing. These operations normalize variations of individual merchants names to a single common merchant name to allow for consistent identification of transaction at the merchant. This processing is managed by the vector generation module 510.

Nothing in the above discussion of Lazarus teaches "an item table that contains information about individual items referenced in the transactional data." Applicants' attorney notes that the term "items" is defined in this application as "items purchased by customers," not merchant names. Instead, the above discussion relates only to merchant names.

In yet another example, consider the teaching of Lazarus at col. 12, lines 50-62:

Lazarus: col. 12, lines 50-62

Customer summary file 404: The customer summary file 404 contains one record for each customer that is profiled by the system, and includes account information of the customer's account, and optionally includes demographic information about the customer. The consumer summary file 404 is typically one that a financial institution, such as a bank, credit card issuer, department store, and the like maintains on each consumer. The customer or the financial institution may supply the additional demographic fields which are deemed to be of informational or of predictive value. Examples of demographic fields include age, gender and income; other demographic fields may be provided, as desired by the financial institution.

Nothing in the above discussion of Lazarus teaches "a department table that contains aggregate information about the transactional data." Instead, the above discussion relates only to customer summary data.

Consequently, the Fayyad and Lazarus Huben references, taken individually or in combination, do not describe a data model comprising a Gaussian Mixture Model that stores transactional data, a basket table that contains summary information about the transactional data, an item table that contains information about individual items referenced in the transactional data, and a department table that contains aggregate information about the transactional data, and the data model is mapped to aggregate the transactional data for cluster analysis.

Moreover, Van Huber fails to overcome these limitations of Fayyad and Lazarus. Recall that Van Huber was only cited for teaching a relational database management system for storing the data model, and then only against the dependent claims.

Thus, the references do not teach or suggest Applicants' invention. Moreover, the various elements of Applicants' claimed invention together provide operational advantages over the references. In addition, Applicants' invention solves problems not recognized by the references.

Thus, Applicants' attorney submits that independent claims 1, 9 and 17 are allowable over the references. Further, dependent claims 3-8, 11-16 and 19-24 are submitted to be allowable over the references in the same manner, because they are dependent on independent claims 1, 9 and 17, respectively, and thus contain all the limitations of the independent claims. In addition, dependent claims 3-8, 11-16 and 19-24 recite additional novel elements not shown by the references.

III. Conclusion

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited. Should the Examiner believe minor matters still remain that

can be resolved in a telephone interview, the Examiner is urged to call Applicants' undersigned attorney.

Respectfully submitted,

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